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FMC Corporation

Phosphorus Chemicals Division
Box 4111
Pocatello, Idaho 83205
(208) 236-8200
FAX (208) 236-8396

FMC

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December 13, 2001

Mr. Richard A. Albright, Director
Office of Waste and Chemical Management
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Response to Notice of Deficiency dated November 8, 2001 – Pond 18 Closure Plan, Volume1-3. Astaris Idaho LLC. EPA ID No. IDD 07092 9518

Dear Mr. Albright:

This letter and attachment provide FMC's response to the Notice of Deficiency (NOD) –Pond 18 Closure Plan Volume 1-3, Astaris Idaho LLC, EPA ID No. IDD 07092 9518 received on November 13, 2001. The attachment provides responses and modifications to the Pond 18 closure plan in the same order as the general and specific comments contained in the NOD dated November 8, 2001. On or before December 28, 2001, FMC will submit separately a response to the remainder of the comments enclosed with the NOD letter that primarily relate to the Quality Assurance Project Plans and Field Sampling Plans and require a response within 45 days of receipt.

As you know, Astaris recently announced that phosphorus production will cease at the Pocatello plant no later than the end of this year. Despite this announcement, FMC remains committed to the closure schedule and procedures detailed in the Pond 18 Closure Plan. As stated in our letter of October 29, 2001, the closure plan proposes that water will be transferred within the waste management unit (WMU), from Cell A to Cell B, and then removed from the WMU. With respect to the management of water after removal from the WMU, the closure plan states that "water will be removed and routed to the plant for reuse as process water (ICW), sent directly to the LDR treatment plant, or otherwise managed in accordance with RCRA requirements." Since water reuse as ICW and management through the LDR system are no longer viable options due to the announcement of plant shutdown, FMC is evaluating on-site water treatment and off-site disposal options to manage water from the Pond 17 and 18 closures. The attachment specifies those sections of the Pond 18 closure plan modified to reflect these changes.

Certain procedures described in the Pond 18 closure plan were developed specifically to address EPA's concern regarding gas monitoring and responses during closure and post-closure. The closure plan includes procedures for protection of workers in the pond area, and continued operation of the FTIR system on Cell B. The attachment provides additional clarification regarding relocation of the FTIR system to provide construction access to Cell A, and continued monitoring at Cell B. The closure plan calls for both an interim contingent gas extraction system under the temporary cover and a permanent gas monitoring/contingent gas extraction system under the final

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cover at Pond 18 Cell A. The attachment provides additional clarification regarding the interim gas collection system.

FMC has communicated its need to receive EPA approval of the initial fill phase of closure by January 2, 2002 in order to conduct the work during the 2002 construction season. As we have explained to EPA, the Super Span that is required for sand fill placement must be ordered by January 2, 2002 to assure availability and mobilization to the site in time to begin work in May, which is necessary to allow the initial fill and cover at Pond 18, Cell A to be placed during 2002. Ordering this equipment requires a non-refundable commitment of funds. The overall schedule for construction of the initial fill phase at Pond 18 runs from May to November. If the work does not commence on schedule, the likelihood that the initial phase, particularly installation of the temporary cover, can not be completed due to inclement weather increases significantly.

Please feel free to contact me at (208) 236-8658 should you have questions regarding this response.

Very truly yours,

Rob J. Hartman
FMC Corporation

Attachments

cc: Andrew Boyd, EPA w/o attachments
Linda Meyer, EPA w/ attachments (2 copies)
Susan Hanson, Shoshone-Bannock Tribes w/ attachments
Jeanette Wolfley, Shoshone-Bannock Tribes w/ attachments
Chairman, Shoshone-Bannock Tribes Business Council w/ attachments

EPA GENERAL COMMENTS and ASTARIS RESPONSES

POND 18 CLOSURE PLAN, Volume 1 and 2, Cell A

1. 40 C.F.R. § 265.228 (b)(2) requires the owner/operator of a surface impoundment which is to be closed as a landfill to, among other things, maintain and monitor the leak detection system in accordance with 40 C.F.R. § 265.226(b). 40 C.F.R. § 265.226(b)(2) requires the company to record the amount of liquids removed from the leak detection sump at least weekly during phase 1 of the closure, and with reduced frequency after the final cover is installed depending on the amounts of liquids found in the sump. The Closure and Post-Closure Plan must be revised to comply with 40 C.F.R. § 265.226(b)(2) and include: 1) piping and system modifications for continued operation of the leak collection, detection, and removal system (LCDRS); 2) operating plans to monitor and remove liquids from the sumps and; 3) record keeping for the amount of liquid collected in the sumps.

   Response: 1) Piping modifications are not needed as part of the pond closure and were not addressed in the closure plan as closure activities will not interfere with the LCDRS. The Pond 18 LCDRS is presently piped to an existing header pipe that routes water back into Pond 18. When Pond 18 is closed, the connection to the header pipe will be modified to convey any water to a new on-site water treatment facility or to direct it to other RCRA-compliant management.

   Section 7.2.1, page 7-28, last paragraph will be revised as follows: "The existing leak detection system will continue operating during closure and post-closure. The system will be maintained, inspected, and monitored per Appendix A Sections 9.0 and 10.0 of the RCRA Pond Management Plan (September 1998) and in accordance with 40 CFR § 265.226(a) and § 265.226(b). The LCDRS sump discharge piping will be disconnected from the current header pipe and rerouted to a pumping system prior to the pond closure dewatering activity. Any water in the system will be removed and sent directly, via the pumping system, to a new on-site water treatment facility or otherwise managed in accordance with RCRA requirements."

   2) For operating plans during closure, see the response to 1) above. For post-closure, water removed from the sump is addressed in Section 10.3, page 10-8, last sentence of the first paragraph, which states "Water removed from the leachate collection sump will be disposed of as described in Section 8.11.2". The following clarification will be made to the beginning of the paragraph in Section 10.3: "The LCDRS will be maintained and monitored per Appendix A of the RCRA Pond Management Plan (September 1998) and in accordance with 40 CFR § 265.226(b). The leak detection observation well/sump will also be inspected quarterly during the post-closure period and within..."

   3) Record keeping is addressed in Section D.8.2 of the RCRA Part B Permit Application.

   See the responses to Specific Comment Nos. 2, 9, 14, 26 and 27 related to the LCDRS. Astaris has announced that phosphorus production will cease at the Pocatello facility in the near future. Both the closure plan and the responses presented in this document refer to

procedures specified in other documents that address the operation, inspection, monitoring, and reporting requirements of the LCDRS during the closure and post-closure period. Astaris will be reviewing and revising, as appropriate, several of these documents (for example the RCRA Pond Management Plan (PMP), the RCRA Interim Status Inspection Plan, and the RCRA Part B Permit Application) to reflect the non-operational status of the facility. Astaris may consolidate or realign the documents in which record keeping procedures are described, but in no event will record keeping requirements for the Pond 18 LCDRS be reduced from those currently described in the closure plan and PMP.

2. The Pond 18 Closure Plan contains repeated statements concerning the similarity of waste in Pond 18 with waste in Ponds 8S and 15S where there has been no reported problems with phosphine gas during closure. These assertions may be correct, however, absence of adequate characterization data for the wastes in the ponds 8S, 15S, and 17 raises concern that the Pond 18 wastes may be similar to those in Pond 16S, where gas emission occurred in early 2001. The Closure Plan must be revised to include:

   a) Results of analyses that have been conducted on the wastes in Pond 18, and a list of all hazardous constituents likely to be found.

   Response: Results of Tank V-3600 and Tank V-3800 sampling conducted pursuant to the facility's waste analysis plan (WAP) are included as Attachments 1 and 2 to this response document. Attachment 3 presents the results of organics analyses performed on a sample collected from V-3600 on January 30, 1998.

   b) Results of any separate analyses for pond solids and liquids (decant water) for Pond 18 wastes, including total phosphorus results and toxicity characteristic leaching procedure extract analyses results from solids samples.

   Response: The results of Pond 18 decant water sampling conducted pursuant to the facility's WAP are included in Attachment 4. The results of a Pond 18 decant water sampled and analyzed by Astaris are provided as Attachment 5. This latter sample is the same sample discussed on page 5 of Attachment 3 to Astaris's October 29, 2001 letter to the EPA "Response to Notice of Deficiency – Section 6.6, Pond 18 Closure Plan."

   c) An assessment of the representativeness of the above data.

   Response: The sampling and analytical methods were established to provide representative samples and comparable results using EPA established analytical methods to the extent practicable. The samples, collected and analyzed pursuant to the WAP, were compared to the waste characterization for the wastes placed in Pond 18 that is included in Section C.2.2 of the RCRA Part B Permit Application. The results of WAP samples are consistent with the waste characterization.

   d) An evaluation of the waste chemistry and an assessment of the potential for closure of Pond 18 to result in generation, accumulation and ignition of phosphine gas. This

evaluation must include a quantitative assessment of the long-term potential for generation of phosphine gas.

Response: This issue is addressed in Section 7.1.4 of the Closure Plan.

e) An assessment of the presence and the potential for future generation of hydrogen cyanide gas and other toxic gas releases from Pond 18.

Response: Future gas generation in general is discussed in Section 7.1.4. The potential source of hydrogen cyanide gas is from cyanide in the wastes within Pond 18 only to the extent that it has not yet escaped or reacted with the other constituents of the waste. During closure operations the wastes will not be agitated to a degree that will mix wastes of different characteristics and create new reactions, i.e. there will be no sludge-intrusive activities at the pond. Future generation of hydrogen cyanide from the capped wastes is unlikely as the capped unit will essentially be a closed system, hence changes in the chemistry of the waste are not anticipated.

The Closure Plan must be revised to account for the above waste analyses and predicted waste behavior and describe in detail how the proposed closure will control, minimize or eliminate the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to groundwater, surface water and the atmosphere.

Response: The Closure Plan was prepared to account for these requirements and considerations consistent with RCRA regulations. The elements of the closure design that protect the environment from the release of enclosed wastes are addressed in Sections 2.3.2, 6.1, 6.2.1, 7.1.4, 7.2, 7.6, 8.9, 10.5, and 10.8. Section 6.2.1 specifically states "Capping of Pond 18, Cell A, will control infiltration of rainwater into the pond solids at that cell. This will minimize the potential for migration of constituents from these pond solids into groundwater or subsoil. Waste migration into surface waters will also be prevented by capping, as it will minimize chances of contaminated precipitation runoff." A description of the LCDRS is included in Section 2.3.2 and its continued operation is addressed in Section 8.9. Gas generation and control (released into the atmosphere) is addressed in detail in Section 7.1.4. No revisions to the Closure Plan are necessary.

EPA SPECIFIC COMMENTS and ASTARIS RESPONSES

POND 18 CLOSURE PLAN, Volume 1 and 2, Cell A

1. Section 2.3.1, page 2-4, third paragraph
   This paragraph should clarify that these samples were taken after the wastes were treated with lime in a slurry of 20 % solids. Since the waste was treated at the point samples were obtained, these samples were not representative of the waste at the point of generation.

   Response: This question doesn't seem to be relevant to Pond 18. The samples evaluated were representative of the materials placed in the ponds. However, for clarification, the fifth sentence in the third paragraph will be revised as follows: "Prior to installation of lime treatment, all samples were taken from the pipeline at the furnace building prior to the precipitator slurry being transferred to surface impoundments." In addition the following sentence will be added to the end of the paragraph: "Samples taken from Tanks V-3600 and V-3800 are representative of the wastes placed in Pond 18."

2. Section 2.3.2, page 2-5 Unit Description
   The operational history for Pond 17 should include a description of the status of the Pond 17 bottom liner system, i.e., if the primary liner is leaking or has leaked. The Closure Plan should include the dates any leaks were detected, leakage rates, and the total volumes pumped from the LCDRS sump.

   Response: We assume that the EPA intended to reference Pond 18 in this comment. The following sentence will be added to the end of the last paragraph in Section 2.3.2: "The allowable leakage rate (ALR) for the pond, established in accordance with 40 CFR 265.222(a), is 1750 gallons/acre/day (gpapd)." The following sentences will be added to Section 2.3.3: "The pumping rate from the LCDRS sump has never exceeded the action level of 50% of the ALR, with an average rate for the year 2000 of 0.015 gpapd, and a total volume pumped from November 11, 1998 through October, 2001 of 18.8 gallons. There is no evidence that the bottom liner has been breached."

3. Section 4.2, page 4-4
   This section should clarify that post-closure monitoring begins at the time the final cap is installed.

   Response: The portion of the second sentence of the third paragraph of Section 4.2 which reads "After completion of the closure activity" will be changed to read "After installation of the final cap".

4. Section 4.2, page 4-4
   Elemental phosphorus must be added to the list of constituents for groundwater monitoring.

   Response: Elemental phosphorus is not an appropriate indicator parameter for leak detection groundwater monitoring at Pond 17. As reported in the RCRA Interim Status Groundwater Monitoring Assessment reports, elemental phosphorus has not been found at

detectable levels in downgradient wells at Pond 8S during semi-annual groundwater monitoring from 1998 through 2000. Sampling and analyses performed to-date in 2001 confirm these results. There is no evidence that elemental phosphorus is migrating to groundwater from an unlined, identified leaking pond (8S) and thus is not a useful groundwater indicator parameter. Therefore, the use of elemental phosphorus as a groundwater monitoring parameter for leak detection at lined ponds, such as Pond 17, will not provide information useful in determining the status of the pond. No revisions to the Closure Plan are necessary.

5. Section 6.1, first bullet
   This section must clearly state that bird netting will be maintained over Cell B for the period Cell B is used to manage waste/waste water.

   Response: The first bullet in Section 6.1 will be revised to read as follows: "Remove, decontaminate as necessary, and dispose of bird netting over Cell A. The bird netting over Cell B shall be disconnected from Cell A and left in place until final closure of Cell B."

6. Section 6, Page 6-2, eighth bullet
   This bullet should include installation of temperature and pressure monitoring equipment.

   Response: The eleventh bullet of Section 6.1 will be revised to read as follows: "Mobilize the contractor, remove and dispose of the temporary cover, regrade the subgrade, place the final cover, install settlement monuments, install temperature and pressure monitoring equipment, certify closure as discussed in Section 8.12, and demobilize the contractor."

7. Section 6.6, Schedule
   FMC/Astaris must provide the basis for the time estimated to conduct the closure. A detailed schedule for the removal of residual water, sediments, and liner from Cell B must be provided.

   Response: This issue was addressed in Astaris's letter to the EPA "Response to Notice of Deficiency – Section 6.6, Pond 18 Closure Plan," dated October 29, 2001. Closure of Cell B will occur in the first complete construction season following the date the Cell A subgrade settlement rate diminishes to the acceptable level of 1-inch per year. The duration anticipated for each element of the Cell B closure is presented in Table 4.1 of Volume 3 of the Pond 18 Closure Plan. No revisions to the closure plan are needed.

8. Section 6.6, Page 6-7,last paragraph
   This paragraph must include the number of days Astaris will notify EPA in advance of initiating closure work.

   Response: The last sentence of Section 6.6 will be revised to read as follows: "Therefore, Astaris will review the schedule to finalize the specific calendar days for the closure activities, notify EPA at least 60 days prior to beginning closure, and proceed with the closure as planned."

9. Section 6.6.1, Page 6-7
This paragraph states Astaris will continue to monitor the leak detection system for the surface impoundment. The closure plan must be revised to record the results of this monitoring activity in the operating record and reported annually.

Response: Monitoring results recording and reporting for the Pond 18 LCDRS are addressed in Section D.8.2.6 of the RCRA Part B Permit Application.

The monitoring and inspection activities during closure and post-closure become part of the operating record. Astaris is not aware of a specific regulation or requirement for routine annual reporting of LCDRS monitoring activity during closure and post-closure. Prior to closure, if the ALR is exceeded, Astaris will initiate the appropriate response as specified in the Response Action Plan.The following sentence will be added to Sections 6.6.1 and 10.3: "The results of inspections, monitoring activities, and water quantities related to the LCDRS during closure and post-closure are maintained at the facility."

10. Section 6, Page 6-8, Table 6-1
The schedule must be revised to include the activity of removing the bird netting and support structure.

Response: The netting and its support structure are a single system that is anticipated to take three to four weeks to remove. The actual duration and sequencing of the work will be determined by the contractor who will perform the work. Therefore, no more detailed schedule for this activity will be available until after EPA approves the initial fill phase of closure and Astaris completes a contract for the work.

The following paragraph will be added to the end of Section 2.3.2: "Nylon netting was placed over the pond to prevent birds from landing on the water. The nylon net is supported by and tied to a grid of steel cables spaced at four-foot intervals. The steel cables are tied to a 36-inch diameter pipe which is set on the pond dike and extends completely around the pond. The 36-inch pipe is secured to deadman anchors located outside of the pond area to resist the tensile forces in the cables that support the bird netting, except for the north side where the perimeter pipe is attached with cables to the Cell B bird netting perimeter pipe. The bird netting is overlain in turn by a second set of steel cables that run only in the short direction of the pond and provide further restraint to the nylon netting."

The sub-section entitled "Bird Netting Removal" in Section 8.6.2.2 will be revised to read as follows: "Bird Netting Removal. To provide access to the pond area for backfilling, the bird netting system will be removed, decontaminated if necessary, and disposed of appropriately. Prior to removing the bird netting from Cell A, new anchors for the Cell B bird netting will be installed in the dike between the two cells. The bottom steel cable grid will support the removal of the upper steel cables and the bird netting and will prevent them from coming in contact with the waste. Similarly, the longitudinal cables of the bottom cable grid are supported on the lateral cables and can also be removed without

contacting the waste. However, the lateral cables are unsupported and it may be difficult to safely prevent them from dropping into the pond sludge during the removal process. These cables are basically wire ropes and it may be difficult to remove wastes that become entrapped within the spaces between the individual steel strands of the cables. Therefore, any components of the bird netting system that cannot safely be removed and/or decontaminated will be left within the area enclosed by the pond dikes and within the pond sludge. All other components of the bird netting will be disposed of according to applicable RCRA requirements as described in Section 8.11.3."

11. Section 6.7, page 6-9
The closure plan should be revised to state that EPA will be notified with-in 5 working days of any unexpected events that affect the closure plan and would result in an amendment to the plan.

Response: The following sentence will be added to the beginning of the last paragraph in Section 6.7: "Astaris will notify the EPA within five working days of any unexpected events that would affect the closure plan and would result in an amendment to the plan."

12. Section 7.1.4, Page 7-12
This section of the Closure Plan suggests that phosphine gas problems in Pond 16S are "potentially attributable to the phosphine released during sludge intrusive activities of the center dike construction..." The problems in Pond 16S, however, could also be reasonably attributed to desaturation of the pond solids at the edge of the pond as a result of differential settlement and consequent exposure of the pond solids to air. The potential for this event occurring at Pond 18 must be addressed in the Closure Plan.

Response: Desaturation of pond solids is not considered to be a significant contributor to the generation of gas at Pond 16S, even considering possible differential settlement. Differential settlement at Pond 16S was no greater than at other ponds and the physical configurations of both the initial fill and the final cap severely inhibit the possibility of both the sludge drying and oxygen reaching the sludge.

The initial sand fill at Pond 16S was placed in very uniform layers with the Rotec Super Span equipment. Experience gained the previous year allowed the placement technique to be refined to the point where no mud waves were observed during sand placement. To control the possibility of sludge being squeezed up the faces of the dikes under the fabric, the level of the sand at the edges of the pond was kept above the level of the sand in the remainder of the pond. There was no evidence of sludge being squeezed above the original sludge level by the weight of the fill at any location in the pond. In addition, Pond 16S settlement measurements indicated the pond sludge settled in a more or less uniform manner.

Once the initial sand fill was in place, the dewatering of the fill was accomplished using the dewatering piping placed on top of the geofabric. The water is pumped from the 2-inch diameter insert pipe by pumps located on the pond's perimeter dikes. Once the water level is lowered to the point where air starts entering the 2-inch pipes, automatic controls shut

off the pump. Hence, the dewatering system is incapable of lowering the water within the sand fill to lower than several inches above the geofabric. Even if there are irregularities in the surface of the sludge, such that some sludge high-points are above the water level, capillary forces within the fine grained sludge and wicking within the overlying geofabric will keep the sludge in an essentially saturated state.

After the placement of the temporary HDPE liner over the initial fill, the pond solids and the initial fill were completely enclosed by one or more impermeable layers with the exception of the space between the anchor trenches of the temporary liner and the pond lining system. This more or less closed system would have severely restricted the entry of air. It is reasonable to assume that any air originally trapped within the initial fill was essentially saturated with moisture at the time the HDPE liner was placed due to the presence of water within the fill. The presence of water within the fill would also cause any air entering the fill to replace the water withdrawn by the extraction system to quickly become saturated. Saturated air is not capable of drying the sludge. Further, the fabric over the sludge is covered by three or more feet of sand. Air circulation within the sand is very restricted due to the small sizes of the pores between the sand particles and the lack of pressure differentials. These factors combine to make it unlikely that the air within the fill could dry the geofabric and the underlying sludge faster than capillary forces and wicking action could re-wet them, hence making it extremely unlikely that any air could come into contact with dry sludge.

Even if some portion of the sludge were to become dry, it would still be covered by several feet of sand. As described in Sections 8.2 and 8.6.2.2 of the Pond 16S Closure Plan and as experienced working with pond sludge at the site, 6 inches of sand cover has been shown to be adequate to prevent the sludge from oxidizing.

As the above discussion demonstrates, oxidizing of the pond sludge caused by differential settlement is extremely unlikely. This fact is supported by observations at other ponds that have been initially backfilled since gases have not been detected at these ponds. Observations at Pond 15S in particular are relevant as the initial fill at Pond 15S was constructed in a similar fashion to that of Pond 16S. In both cases, the perimeter dikes were raised to provide added freeboard, center dikes were constructed, and both were backfilled using similar if not identical procedures and methods. Observed and measured settlement readings at both ponds indicated similar sludge consolidation characteristics. However, Pond 15S did not contain lime-treated solids (thereby limiting the potential for mixing lime and non-lime treated solids) and no gas generation was observed at Pond 15S, unlike that which occurred near the Pond 16S west dike area where lime and non-lime treated materials were mixed or disturbed.

The potential for gas generation in the sludge is discussed in considerable detail in Section 7.1.4 of the Closure Plan. If gas generation should occur at Pond 18, the contingent gas collection system discussed in Section 8.6.2.2 will be adequate to collect and treat the gas generated. Hence, no changes to the Closure Plan are necessary. See the response to Specific Comment No. 19 for a further discussion regarding differential settlement, Specific

Comment No. 14 for desaturation under the final cap, and General Comment No. 2 for a further discussion on gas generation at Pond 16S.

13. Section 7.1.4, Page 7-12

This section notes that contingent temporary gas collection piping will be installed under the temporary cover on Pond 17, in case gas buildup occurs as it did at Pond 16S. The Closure Plan must describe how this contingent system will be installed to prevent the pond solids from being exposed to air if the gas extraction system is operated.

Response: We assume that the EPA intended to reference Pond 18 in this comment. As described in Section 7.1.4.1, first paragraph of the subsection titled "Pressure Monitoring (Gas Collection) System", "A temporary system, similar in function, will be installed under the temporary cover to collect potential gas buildup during initial fill consolidation. The operations and maintenance of the monitoring systems are discussed in Attachment 10-2a, Section 2.5 and Attachment 10-2b, Section 4". Similar to the pressure monitoring system piping, the piping for the contingent system as described in the closure plan will be installed in the 6-inch thick liner foundation sand layer directly underneath the temporary cover. The piping and the sludge will be separated by at least 5 or more feet of sand and slag (initial fill), which, as stated in response to Specific Comment No. 12, will be more than adequate to prevent oxidation of the sludge. Furthermore, the proximity of the piping system to the edges of the fill will ensure that any air being drawn into the fill will be preferentially drawn into the gas collection piping rather than displacing the saturated air within the sand fill. No revisions to the Closure Plan are necessary. Also see the response to Specific Comment No. 25.

14. Section 7.1.4, Page 7-12

The Closure Plan provides no information on the current status of the primary liner. If the primary liner in Pond 17 is currently not leaking, it is still reasonable to expect that minor breaks in the liner already exist or will develop during the post-closure period. If gases are generated in or volatilize from the wastes, they may migrate into the leak detection system (between the primary and secondary liners) and into the LCDRS sumps. Due to the potential for migration of gas outside the limits of the temporary and final cover, the Closure Plan must be revised to include gas monitoring outside the cap limits. Monitoring must include ambient monitoring at a downwind location and gas sampling in the LCDRS sump manhole during each inspection and response procedures in the event elevated levels of phosphine of hydrogen cyanide gas are detected.

Response: We assume that the EPA intended to reference Pond 18 in this comment. At this time, the LCDRS monitoring does not indicate that there are any significant leaks in the primary pond liner. As the pond is nearly full of sludge and water, any minor breaks within the liner would likely be below the water surface and water would be passing through any breaks rather than gas. The proposed placement method for the initial fill is very unlikely to damage the liner. Hence, the likelihood for the development of new breaks in the liner is very low. Gases would be most likely to enter the LCDRS system in a dissolved state within any small amount of pond water that may enter the system from the pond. Additional gas could be generated by oxidation of any constituents within the water

when the water is exposed to air within the LCDRS. In either case, the quantities involved are predicted to be very low based on experience to date. The personal gas detection meters used by the personnel that perform the LCDRS sump monitoring have not detected any measurable quantities of gas. Migration of gas through the secondary liner would, for the same reasons discussed above for the primary liner, be at a very low rate. Any gas that eventually migrated to the surface outside the cap limits would be at undetectable concentrations downwind from the pond. No revisions to the Closure Plan are necessary.

15. Section 7.2.1, Page 7-28, fourth paragraph
The sludge depth which would trigger placement of wick drains must be stated. Closure Plan must include the expected spacing and number of wick drains. Additional details must be provided on how the bottom liner will be protected from punctures during installation of wick drains.

Response: Historically, a determination of the benefit of drainage wicks has been done on a case by case basis due to the number of variables involved. The concept of a specific "trigger" depth is not used. The determination of a "trigger" depth would require a pond-specific parametric study that has never been warranted as the sludge thickness used in the design is a specific number for each pond. The settlement analysis presented in Section 5.3 of Appendix I indicates that primary consolidation would be completed in about 12 months after filling commences. Section 5.3 goes on to note that the secondary settlement (creep) was estimated to be 0.32 feet per log cycle. This translates to a creep rate of one inch per year not being reached until 20 months after filling commences. The rate of creep is not impacted by drainage wicks. Hence, the presence of drainage wicks will not result in the target settlement rate of one inch per year being achieved any earlier. No revisions to the Closure Plan are needed. Also see the response to Specific Comment No. 17.

16. Section 7.2.1, page 7-28, fifth paragraph
In addition to managing the water collected in the existing leak collection and detection system in accordance with RCRA the continued operation needs to be in accordance with RCRA during the post-closure period.

Response: Section 7.2.1 of the closure plan will be revised as noted in the Response to General Comment No. 1.

17. Section 7.4, page 7-36
Additional explanation regarding the meaning of "construction restriction resulting from the lack of protective soil cover over the sacrificial liner", and how this relates to the decision not to install wick drains in this unit must be provided.

Response: In Pond 17, where the use of drainage wicks is proposed, the bottom liner system is protected by a one foot thick layer of native silt covered with three-foot thick layer of slag. Whereas, in Pond 18, there is no protective layer over the sacrificial liner and the sacrificial liner is only separated from the primary liner by one foot of native silt. Wicks are installed using a mandrel mounted on a piece of construction equipment. The depth of wick penetration will be monitored during the entire wick installation operation.

However, should the mandrel inadvertently penetrate too deeply into Pond 17, it would hit the slag protective layer which would provide the warning needed by the installation personnel to stop the installation and maintain the integrity of the pond liner system. Unlike Pond 17, the mandrel would easily penetrate the sacrificial liner in Pond 18 and potentially could also penetrate the compacted silt layer and the primary liner before an increase in the resistance to pushing the mandrel may be noticed by the installation personnel. For this reason, it was judged to be unsafe for wicks to penetrate closer than 4 feet from the estimated bottom liner elevation. The projected elevation for the top of the sludge at the time closure begins is 4439 feet and the toe of the interior slopes of the perimeter dikes is at elevation 4429 feet, for an initial overall sludge thickness of 10 feet. Based on past experience, initially filling may result in up to 2 feet of settlement. Therefore, the sludge thickness at the time wick drains would be installed would be on the order of 8 feet. This would limit the drainage wicks to a safe depth of about 4 feet from the top of the sludge, or only half way through the sludge. This relatively short penetration into the sludge severely limits the potential benefit that can be provided by drainage wicks. When combined with the anticipated rapid completion of primary consolidation without wicks, the potential gain was not deemed worth the risk of damage to the liner system. No revisions to the Closure Plan are needed.

18. Section 7.4.8, Page 7-42
The Closure Plan must address the fate of the capped waste in the event the solids completely dewater after the final cap is in place.

Response: As described in Section 7.1.4, page 7-11, bottom two paragraphs, the sludge will remain nearly saturated. A discussion on the potential for desaturation of the sludge is included in the response to Specific Comment No. 12. In the unlikely event some of the sludge does dry, the drying process would be slow and only small quantities would be potentially exposed to oxygen at any one time. Furthermore, as stated in response to Specific Comment No. 12, covering pond solids with at least 6-inch of sand or soil prevents any rapid oxidation of pond solids. The pond solids will at least be covered by 5 feet of sand fill (not to mention the balance of the final cover) which will substantially reduce the potential for gas generation by oxidation. The above two factors would result in a maximum potential gas generation rate that was designed to be handled by the proposed pressure monitoring system and the contingent gas collection and treatment system discussed in Sections 7.1.4.1 and 7.1.4.2. No revisions to the Closure Plan are necessary.

19. Section 7.4.4, Page 7-39
The potential for differential settlement during the initial and final filling are not addressed in the Closure Plan. The Closure Plan must include a proposal for monitoring and addressing differential settlement during initial and final fill.

Response: Settlement monitoring for the period between the placement of the initial fill and the construction of the final cap is addressed in Section 7.4.7. The purpose of settlement monitoring during this period is to determine when the settlement rate has slowed sufficiently to allow for the construction of the final cap. While information on differential settlement can be obtained from the settlement data that will be collected,

differential settlement that occurs prior to installing the final cap is not relevant to the performance of the final cap as the entire surface will be regraded prior to construction of the final cap.

Settlement monitoring after the construction of the final cap is addressed in Section 7.4.9. Section 7.4.8 addresses the potential for differential settlement due to placement of the final cap. Differential settlement will not be directly monitored during this period beyond visual observations made during routine inspections.

The function of the initial fill is to pre-consolidate the pond solids such that the anticipated large and irregular settlement will occur prior to the construction of the final cap. This is to ensure that no significant differential settlement will occur after the final cap is installed, thereby minimizing the impact of differential settlement on the final cap components as well as minimizing surface irregularities and ponding. Settlement (differential or otherwise) that occur during the placement of the initial fill has no impact on the performance of the final cap and is only relevant to construction operations and the determination of the amount of materials placed for contractual purposes.

Estimated settlement after installation of the final cap is less than one foot, which is considered in the final cap design. The potential magnitude and impact of differential settlement on the final cap is addressed in Section 7.4.8. As stated therein, settlement of the final cap is not expected to have any significant detrimental effect on the elements of the final cap.

The Closure Plan as written includes adequate settlement monitoring and need not be revised.

20. Section 8.1, Page 8-1
Additional details must be provided on the removal of bird netting including but not limited to: the plan for removal, location of disposal, and schedule for deconstruction of the net.

Response: See the response to Specific Comment No. 10.

21. Section 8.1, page 8-1 and Section 8.6.2.2, page 8-8
The second bullet should include capping/plugging of the overflow pipe to Cell B.

Response: The two bullets will be revised to read "Manage, remove and relocate portions of the FT-IR system and plug the overflow pipe to Cell B" and "Management, removal and relocation of the FT-IR system and plugging of the overflow pipe to Cell B" respectively.

22. Section 8.6.2, page 8-6
This section identified types of backfilling and includes raising the perimeter dikes which is not discussed in any other section of the Closure Plan. The Closure Plan should make clear whether this step is necessary to initiate Phase 1 closure.

Response: Design development has eliminated any anticipated need to raise the dikes beyond regrading the dike surface. The subject phrase will be removed.

23. Section 8.6.2.2, Page 8-9

Additional detail must be provided on the proposal to dispose of the bird netting inside Pond 18. A detailed plan for safely handling the net removal to minimize the potential for disposal of the net in Pond 18 must be provided. In addition, a contingent plan for safe decontamination and disposal in case the netting becomes contaminated with elemental phosphorus waste must be developed. Disposal of any of the bird netting system in the pond is acceptable only if there is a demonstration to EPA's satisfaction that there is no other workable alternative.

Response: See the response to Specific Comment No. 10.

24. Section 8.6.2.2, Page 8-9

The specific locations the pond emission monitoring system (FTIR) will be relocated to and reinstalled must be provided in the plan. Plans for continued monitoring at the FTIR locations, at the fence line, and off site and responses if thresholds are exceeded must be included.

Response: A new drawing (Figure 8-1, copy attached) will be added to Section 8.6.2.2 that shows the current and future locations of the Pond 18 FT-IRs. A reference will be added to the end of the "FT-IR System Management and Removal" subsection of Section 8.6.2.2. During periods where the FT-IRs are inoperable, monitoring will continue to be performed by the construction work. Each work crew performing work in the pond area will have a personal phosphine monitor and work rules for all pond closure activities will be in full conformance to the requirements of the Plant Worker Safety Procedure as outlined in the RCRA Pond Management Plan and the Task-Specific Health and Safety Plan for Pond 18 (Appendix E). The personal phosphine monitor(s) have been and will continue to be a far more effective method for monitoring personnel exposures and taking appropriate action to minimize worker exposures. Procedures for contingent monitoring at the fence line and off site for the case where thresholds are exceeded at the FT-IR locations are addressed in Sections 3.3.2.3 and 3.3.3 of the PMP. No revisions to the Closure Plan are necessary.

25. Section 8.6.2.2, Page 8-10

Additional detail regarding the installation and potential operation of the perforated PVC piping installed in the sand bedding layer to collect gas that may be generated during the initial closure phase must be provided. Specific procedures including but not limited to the depth, spacing, access ports, protective covering, etc. must be included. A description of the operation should that be necessary including location/installation of gas extraction equipment, and operation of the carbon treatment unit must be included.

Response: The paragraph for "Perforated PVC Piping and Sand Bedding" in Section 8.6.2.2 will be modified to read as follows: "As the initial sand and slag fill will be covered with a temporary impermeable geomembrane, a contingent system of perforated PVC piping, described in Section 7.1.4.1, will be installed beneath the geomembrane to collect any potential gas build-up underneath the temporary cover. This piping system will be similar to the pressure monitoring piping system as depicted in Figure 7-3. The piping with have two outlets, which penetrate the temporary cover at opposite corners of the

pond. Should phosphine build up underneath the temporary cover, the outlet(s) will be connected to gas treatment system(s) as described in Section 7.1.4.2. The treatment system(s), equipped with one or more blowers and carbon treatment units, will be installed on the dike of the pond, adjacent to the outlet(s). Gases would be evacuated from the outlet of the contingent gas collection system and routed to the treatment unit by blowers."

26. Section 10

The Closure Plan states that the existing LCDRS system will be operated during the settlement period and later during the post closure period in accordance with 40 CFR 265.228(b)(2). This regulation requires maintenance and monitoring of the leak detection system, and recording of the amount of liquids removed from the leak detection sump at least once each week during the active life and closure period, (this may be reduced to monthly and in some cases quarterly or semi-annually after the final cover is installed). 40 C.F.R. §§ 265.226(b)(1) and 265.221(a) specifically require leak detection system inspection and recording of liquids removed, and collection and removal of pumpable liquids in the sump. The Closure Plan must be revised to provide for inspection of the leak detection sump at least weekly, and recording of the amounts of liquids removed, during the closure period and after the closure period, in accordance with the applicable regulations.

Response: See the responses to Specific Comment Nos. 9 and 27.

The Closure Plan does not include modifications to the piping from the leak detection ("LCDRS") sump to include standpipes, valve boxes or other arrangements where liquids removed from the sumps can be transferred to containers (e.g., tank trucks) or routed by pipeline to another treatment, storage or disposal unit. The Closure Plan must be revised to include modifications to the leak detection sump discharge piping and pump control system to allow collection and removal of pumpable liquids from the sump during and after closure.

Response: See the response to General Comment No. 1.

The Plan must be modified to provide for weekly inspections of the leak detection sumps for liquids as required by 40 CFR 265.226(b). In addition, the leak detection system inspection description (page 10-8) does not include the requirement to remove pumpable liquids from the sumps and record the amounts of liquids removed. The Inspection Record Form must be revised to include recording the amount of liquid removed. In addition, the Closure Plan does not mention inspection or removal of liquids from the leak detection sump during closure.

Revise the Post-Closure Plan Inspection Record Form and Activity Checklists to provide for initial monthly inspections of the leak detection sump for liquids, with potential reduced frequencies as provided in 265.226(b)(2). (A separate record form for leak detection system inspections is recommended, with spaces for recording the amounts removed.) Revise the leak detection inspection description to include removal of pumpable liquids and recording of the amounts of liquids removed from each sump.

Response: See the responses to Specific Comments No. 9 and No. 27. In addition, the last sentence of the first paragraph on page 10-8 will be revised as follows: "Water will be removed from the leachate collection sump and disposed of as described in Section 8.11.2."

The Closure and Post-Closure Plans do not mention the pump operating level in the leak detection (LCDRS) sump. This elevation or depth is the level at which the pump operating switch must be set to prevent backup of liquids in the impoundment drainage layer and to minimize head in the sump. The pump operating level is the benchmark against which liquid levels must be measured to comply with 40 CFR 265.226(b)(2). Revise the Closure and Post-Closure Plans to define the pump operating level in the leak detection sump, and provide for measuring of liquid in the leak detection sump in relation to the pump operating level during every inspection of the sump.

Response: See the responses to General Comment #1 and Specific Comments #2 and #14.

27. Section 10 Action Leakage Rate

The Closure and Post-Closure Plans do not include determination of the average daily flow rate, and comparison with the action leakage rate, as required by 40 C.F.R. §265.222(c). The average daily flow rate must be calculated weekly during the active life and closure period, and monthly or less frequently, in accordance with 40 CFR 265.226(b), during the post-closure period.

Revise the Closure and Post-Closure Plans to provide for calculation of the average daily flow rate, and comparison with the action leakage rate and to include a revised response action plan that complies with 40 C.F.R.§ 265.223.

Response: The RCRA Pond Management Plan contains the response action plan and copies of the forms used to record and calculate the average daily flow rate. As stated therein, the LDCRS is inspected and the average daily flow rate is calculated weekly. Similar information is also contained within the RCRA Interim Status Inspection Plan and the Part B Permit Application.

A new sentence will be added to Section 10.3 as follows: "The Interim Status inspections calculations, and Response Action Plans as defined in the Pond Management Plan (September 1998) will be continued during closure and post-closure to comply with 40 C.F.R. §265.222(c) and 40 C.F.R.§ 265.223, Response Actions."

The second paragraph in Section 10.3 will be revised to read as follows: "The leak detection observation well/sump will be inspected quarterly and within 48-hours after each 25-year storm event. The results of inspections, monitoring activities, and water quantities related to the LCDRS during closure and post-closure are maintained in the operating record. Water will be removed from the leachate collection sump and disposed of as described in Section 8.11.2. The Interim Status inspections calculations, and Response Action Plans will be continued during closure and post-closure to comply with 40 C.F.R. §265.222(c) and 40 C.F.R.§ 265.223, Response Actions."

28. Section 10.8, page 10-10

The Post-Closure Plan proposes an action level of 27 inches of mercury as the alarm level and (if confirmed) the criterion for conducting gas sampling. The plan must be revised to justify this action level and to explain how this action level was selected. Records of the typical seasonal ranges and average of ambient barometric pressure in the vicinity of the facility must be provided to support this action level.

Response: The basis for the selection of 27 inches as the action level is addressed in the seventh paragraph of the "Pressure Monitoring (Gas Collection) System" of Section 7.1.4.1. No revisions to the Closure Plan are necessary.

29. Appendix I Report on consolidation and settlement Analysis

Section 2 of this report states that wick drains undoubtedly increase the rate of settlement, but that the magnitude of settlement depends on the thickness of the sediments. Since Astaris/FMC has proposed to continue using Pond 18 Cell B for collection of water resulting from Pond 18 Cell A detwatering until the settling criteria is met, increasing the rate of settlement is desired as this reduces emissions to the atmosphere. The analysis fails to demonstrate the relationship between the rate of settlement and placement or spacing of the wick drains. This information does not support the conclusion presented earlier, to not install wick drains. Further justification must be provided to EPA's satisfaction or a proposal to install wick drains must be included.

Response: See the responses to Specific Comments No. 15 and No. 17. In addition, settlement rate analyses are only approximate in nature due to the complexities involved. A much better guide to predicting settlement rates is to use historical data from similar sites. As noted in Section 7.2, Pond 13S had a sludge thickness similar to the depth anticipated for Pond 18 Cell A at the time of closure. Drainage wicks were not installed in Pond 13S because analyses indicated that the benefit would be negligible. As can be seen from the data presented for Pond 13S in Astaris's July 31, 2001 submittal "Closure Settlement Report for Ponds 8E, 15S, and Phase IV Ponds – Progress Report No. 7, Pond 16S – Progress Report No. 3," the primary consolidation settlement caused by the initial fill at Pond 13S was essentially completed within a few months of the placement of the initial fill. The rate of settlement due to secondary consolidation is independent of the length of the drainage path, hence, drainage wicks do not impact the rate of secondary settlement. No revisions to the Closure Plan are needed. Also see the response to Specific Comment No. 17.

The LDR treatment plant will no longer be available to process water from Pond 18. Water removed from the pond during closure activities will be routed to a new on-site water treatment facility or an off-site facility in accordance with RCRA requirements. To reflect this change, the following revisions will be made to Volume 1 of the Pond 18 Cell A closure plan:

The third sentence in the fifth paragraph of Section 1 will be revised to read as follows: "Any hazardous liquid wastes removed from Pond 18 during the Cell A closure activities or generated from closure equipment decontamination will be sent to a new on-site water treatment facility or otherwise managed in accordance with RCRA requirements."

The last sentence of the seventh paragraph in Section 7.2.1 will be revised to read as follows: "Any water in the system will be removed and sent directly to a new on-site water treatment facility or otherwise managed in accordance with RCRA regulations."

The second sentence of Section 8.11.2 will be changed to read as follows: "Any hazardous liquid wastes removed from Pond 18 or generated from closure equipment decontamination will be sent to a new on-site water treatment facility, or otherwise managed in accordance with RCRA requirements."

Attachments:

1. Summary of Tank V-3600 WAP Sampling Results
2. Summary of Tank V-3800 WAP Sampling Results
3. Summary of Tank V-3600 Organics Sampling Results
4. Summary of Pond 18 Decant WAP Sampling Results
5. Summary of Pond 18 Decant Non-WAP Sampling Results
6. Figure 8-1, FT-IR Relocation

Attachment 1
Summary of Tank V-3600 WAP Sampling Results

Analyte	Analytical Method	Sampling Date				
		01/09/98	09/22/98	07/08/99	07/12/00	06/14/01
Antimony	SW-846 6010B	R	0.71	0.67	1.28	0.743
Arsenic	SW-846 6010B	R	0.167	0.20	0.227	0.25 J
Barium	SW-846 6010B	R	0.015 J	0.098	0.0120 J	0.027 J
Beryllium	SW-846 6010B	0.0250	0.0098	0.0066	0.0042	0.00510
Cadmium	SW-846 6010B	R	0.045	0.119	0.205	0.273
Chromium	SW-846 6010B	0.448	0.232	0.290	0.141	U
Lead	SW-846 6010B	R	0.032 J	0.04	U	U
Mercury	SW-846 7040A	ND	U	U	U	U
Nickel	SW-846 6010B	R	U	0.028	0.138	U
Selenium	SW-846 6010B	R	U	U	0.0360 J	U
Silver	SW-846 6010B	ND	0.003 J	U	0.00480 J	U
Thallium	SW-846 6010B	R	0.022 J	U	0.0290 J	U
Vanadium	SW-846 6010B	0.416	0.236	0.239	0.243	NA
Zinc	SW-846 6010B	65.4	56.7	49.2	22.4	NA
pH	SW-846 9040B	9.0	NA	6.65	5.89	6.220
Cyanide	SW-846 9010B/90	83.5	NA	10.1	11.6	NA
Amenable cyanide	SW-846 9010B/90	79.1	NA	8.13	9.13	NA
Phosphorus, total	EPA 365.3	NA	NA	NA	NA	5,770
Total Organic Carbon	EPA 415.1	U	NA	NA	NA	NA
Total Organic Halogen (ug/L)	SW-846 9020B	U	NA	NA	NA	NA

Notes:

Units are mg/L unless noted otherwise
TCLP extraction for metals by SW-846 1311
U = Not detected
J = Estimated
R = Rejected
NA = Not analyzed

Attachment 2
Summary of Tank V-3800 WAP Sampling Results

Analyte	Analytical Method	Sampling Date				
		01/09/98*	09/22/98*	07/08/99*	07/11/00	6/16/2001
Antimony	SW-846 6010B	NA	NA	0.33	0.295	0.28 J
Arsenic	SW-846 6010B**	R	0.42	0.12	0.0760 J	0.175
Barium	SW-846 6010B**	R	0.117	0.035	0.0110 J	0.0388
Beryllium	SW-846 6010B**	0.0111	0.007 J	0.0027	0.00221	0.00225
Cadmium	SW-846 6010B**	R	0.0032	0.059	0.0150 J	0.0928
Chromium	SW-846 6010B**	0.614	0.162	0.149	0.106	0.145
Lead	SW-846 6010B**	R	0.177	0.02	U	U
Mercury	SW-846 7040A***	U	U	U	U	U
Nickel	SW-846 6010B**	R	U	0.035	0.0361	0.128
Selenium	SW-846 6010B**	U	0.277	U	0.0470 J	U
Silver	SW-846 6010B**	U	U	U	U	U
Thallium	SW-846 6010B**	U	U	U	U	U
Vanadium	SW-846 6010B**	0.255	0.011 J	0.077	0.0896	NA
Zinc	SW-846 6010B**	34.3	0.094	24.8	5.55	NA
pH	SW-846 6010B**	10	5.72	7.07	6.120	6.390
Cyanide	SW-846 9010B/90	NA	NA	23.1	28.3	12 J
Amenable cyanide	SW-846 9010B/90	NA	NA	21.9	27.3	11 J
Phosphorus, total	EPA 365.3	NA	NA	NA	NA	1,340

Notes:

Units are mg/L unless noted otherwise
TCLP extraction for metals by SW-846 1311
U = Not detected
J = Estimated
NA = Not analyzed
R = Rejected
* = Samples collected from the NE Phos Dock Tank, a precursor to V-3800
** = Method SW-846 6010A used for both 1998 samples
*** = Method SW-846 7470 used for both 1998 samples

Attachment 3
Summary of V-3600 Organics Sampling Results

Analyte	Analytical Method	Result	Detection Limit
pH	In-house	**9.0**	1.0
Acetone	SW-846 8260A	U	4.42
Acrolein	SW-846 8260A	U	17.97
Acrylonitrile	SW-846 8260A	U	2.22
Allyl Chloride	SW-846 8260A	U	1.58
Benzene	SW-846 8260A	U	0.43
Bromodichloromethane	SW-846 8260A	U	0.41
Bromoform	SW-846 8260A	U	0.54
Bromomethane	SW-846 8260A	U	1.15
2-Butanone (MEK)	SW-846 8260A	U	3.32
Carbon disulfide	SW-846 8260A	U	0.35
Carbon tetrachloride	SW-846 8260A	U	0.32
Chlorobenzene	SW-846 8260A	U	0.19
2-Chloro-1,3-butadiene (Chloroprene	SW-846 8260A	U	1.14
Chloroethane	SW-846 8260A	U	1.11
Chloroform	SW-846 8260A	U	0.23
Chloromethane	SW-846 8260A	U	0.82
Dibromochloromethane	SW-846 8260A	U	0.53
1,2-Dibromo-3-chloropropane (DBCP)	SW-846 8260A	U	2
1,2-Dibromoethane (EDB)	SW-846 8260A	U	0.65
Dibromomethane (methylene bromide)	SW-846 8260A	U	0.49
trans-1,4-Dichloro-2-butene	SW-846 8260A	U	1.7
Dichlorodifluoromethane	SW-846 8260A	U	0.74
1,1-Dichloroethane	SW-846 8260A	U	0.38
1,2-Dichloroethane	SW-846 8260A	U	0.38
1,1-Dichloroethene	SW-846 8260A	U	0.94
trans-1,2-Dichloroethene	SW-846 8260A	U	1.29
1,2-Dichloropropane	SW-846 8260A	U	0.57
cis-1,3-Dichloropropene	SW-846 8260A	U	0.6
Trans-1,3-Dichloropropene	SW-846 8260A	U	0.37
Ethylbenzene	SW-846 8260A	U	0.21
Ethyl methacrylate	SW-846 8260A	U	0.86
2-Hexanone	SW-846 8260A	U	1.59
Methyl Iodide	SW-846 8260A	U	1.7
Methacrylonitrile	SW-846 8260A	U	4.58
Methylene chloride (Dichloromethane)	SW-846 8260A	U	0.34
Methyl methacrylate	SW-846 8260A	U	0.85
4-Methyl-2-pentanone (MIBK)	SW-846 8260A	U	2.02
Pentachloroethane	SW-846 8260A	U	72
Propionitrile	SW-846 8260A	U	11.55
Styrene	SW-846 8260A	U	0.59
1,1,1,2-Tetrachloroethane	SW-846 8260A	U	0.25
1,1,2,2-Tetrachloroethane	SW-846 8260A	U	1.45
Tetrachloroethene	SW-846 8260A	U	0.58

Attachment 3 (continued)
Summary of V-3600 Organics Sampling Results

Analyte	Analytical Method	Result	Detection Limit
Toluene	SW-846 8260A	U	0.52
1,1,1-Trichloroethane	SW-846 8260A	U	0.4
1,1,2-Trichloroethane	SW-846 8260A	U	0.54
Trichloroethene	SW-846 8260A	U	0.61
Trichlorofluoromethane	SW-846 8260A	U	0.43
1,2,3-Trichloropropane	SW-846 8260A	U	1.33
Vinyl acetate	SW-846 8260A	U	0.94
Vinyl chloride	SW-846 8260A	U	0.87
m+p-Xylene	SW-846 8260A	U	0.9
o-Xylene	SW-846 8260A	U	0.64
Acenaphthene	SW-846 8270A	U	4.84
Acenaphthylene	SW-846 8270A	U	4.37
Acetophenone	SW-846 8270A	U	1.4
2-Acetylaminofluorene	SW-846 8270A	U	2.3
4-Aminobiphenyl	SW-846 8270A	U	7.7
Aniline	SW-846 8270A	U	0.73
Anthracene	SW-846 8270A	U	7.21
Aramite	SW-846 8270A	U	33
Benz(a)anthracene	SW-846 8270A	U	7.49
Benzo(b)fluoranthene	SW-846 8270A	U	6.36
Benzo(k)fluoranthene	SW-846 8270A	U	8.45
Benzo(ghi)perylene	SW-846 8270A	U	6.45
Benzo(a)pyrene	SW-846 8270A	U	10.18
Benzyl alcohol	SW-846 8270A	U	11.12
bis(2-Chloroethoxy)methane	SW-846 8270A	U	5.41
bis(2-Chloroethyl)ether	SW-846 8270A	U	5.45
bis(2-Chloroisopropyl)ether	SW-846 8270A	U	5.44
bis(2-Ethylhexyl)phthalate	SW-846 8270A	U	9.36
4-Bromophenyl-phenyl ether	SW-846 8270A	U	5.46
Butylbenzyl phthalate	SW-846 8270A	U	12.68
p-Chloroaniline	SW-846 8270A	U	4.33
Chlorobenzilate	SW-846 8270A	U	0.74
4-Chloro-3-methylphenol	SW-846 8270A	U	4.31
2-Chloronaphthalene	SW-846 8270A	U	5.15
2-Chlorophenol	SW-846 8270A	U	5.72
4-Chlorophenyl-phenyl ether	SW-846 8270A	U	5.2
Chrysene	SW-846 8270A	U	7.49
2-Methylphenol (o-Cresol)	SW-846 8270A	**7.40**	4.94
Diallate (cis)	SW-846 8270A	U	2.5
Diallate (trans)	SW-846 8270A	U	2.6
Dibenzofuran	SW-846 8270A	U	4.48
Di-N-butyl phthalate	SW-846 8270A	U	12.51
Dibenz(a,h)anthracene	SW-846 8270A	U	6.66
1,2-Dichlorobenzene	SW-846 8270A	U	4.61

Attachment 3 (continued)
Summary of V-3600 Organics Sampling Results

Analyte	Analytical Method	Result	Detection Limit
1,3-Dichlorobenzene	SW-846 8270A	U	4.6
1,4-Dichlorobenzene	SW-846 8270A	U	4.53
3,3'-Dichlorobenzidine	SW-846 8270A	U	6.69
2,4-Dichlorophenol	SW-846 8270A	U	5.43
2,6-Dichlorophenol	SW-846 8270A	U	6.7
Diethyl phthalate	SW-846 8270A	U	9.62
Thionazin	SW-846 8270A	U	1.8
Dimethoate	SW-846 8270A	U	5.8
p-(Dimethylamino)azobenzene	SW-846 8270A	U	2.8
7,12-Dimethylbenz(a)anthracene	SW-846 8270A	U	2.9
3,3'-Dimethylbenzidine	SW-846 8270A	U	4.5
a,a-Dimethylphenethylamine	SW-846 8270A	U	22
2,4-Dimethylphenol	SW-846 8270A	U	4.25
Dimethyl phthalate	SW-846 8270A	U	2.05
Diphenylamine	SW-846 8270A	U	5.5
1,3-Dinitrobenzene	SW-846 8270A	U	1.9
4,6-Dinitro-2-methylphenol	SW-846 8270A	U	6.73
2,4-Dinitrophenol	SW-846 8270A	U	3.23
2,4-Dinitrotoluene	SW-846 8270A	U	4.37
2,6-Dinitrotoluene	SW-846 8270A	U	4.15
Di-N-octyl phthalate	SW-846 8270A	U	8.35
Ethyl methanesulfonate	SW-846 8270A	U	0.99
Famphur	SW-846 8270A	U	7.28
Fluoranthene	SW-846 8270A	U	6.93
Fluorene	SW-846 8270A	U	4.79
Hexachlorobenzene	SW-846 8270A	U	7.14
Hexachlorobutadiene	SW-846 8270A	U	5.33
Hexachlorocyclopentadiene	SW-846 8270A	U	0.48
Hexachloroethane	SW-846 8270A	U	4.79
Hexachloropropene	SW-846 8270A	U	0.9
Hexachlorophene	SW-846 8270A	U	200
Indeno(1,2,3-cd)pyrene	SW-846 8270A	U	6.61
Isodrin	SW-846 8270A	U	2.5
Isophorone	SW-846 8270A	U	5.39
Isosafrole	SW-846 8270A	U	1.6
Kepone	SW-846 8270A	U	110
Methapyrilene	SW-846 8270A	U	13
3-Methylcholanthrene	SW-846 8270A	U	2.6
Methyl methanesulfonate	SW-846 8270A	U	0.77
2-Methylnaphthalene	SW-846 8270A	U	5.01
Naphthalene	SW-846 8270A	U	4.74
1,4-Naphthoquinone	SW-846 8270A	U	0.27
1-Naphthylamine	SW-846 8270A	U	4
2-Naphthylamine	SW-846 8270A	U	4

Attachment 3 (continued)
Summary of V-3600 Organics Sampling Results

Analyte	Analytical Method	Result	Detection Limit
2-Nitroaniline	SW-846 8270A	U	3.84
3-Nitroaniline	SW-846 8270A	U	4.47
4-Nitroaniline	SW-846 8270A	U	4.57
Nitrobenzene	SW-846 8270A	U	4.83
2-Nitrophenol	SW-846 8270A	U	5.32
4-Nitrophenol	SW-846 8270A	U	2.02
4-Nitroquinoline-1-oxide	SW-846 8270A	U	220
N-Nitrosodi-N-butylamine	SW-846 8270A	U	1.4
N-Nitrosodiethylamine	SW-846 8270A	U	4
N-Nitrosodimethylamine	SW-846 8270A	U	3.51
N-Nitrosodiphenylamine	SW-846 8270A	U	5.45
N-Nitrosodi-N-propylamine	SW-846 8270A	U	5.59
N-Nitrosomethylethylamine	SW-846 8270A	U	0.74
N-Nitrosomorpholine	SW-846 8270A	U	0.92
N-Nitrosopiperidine	SW-846 8270A	U	1.5
N-Nitrosopyrrolidine	SW-846 8270A	U	0.97
5-Nitro-o-toluidine	SW-846 8270A	U	1.8
Parathion, Ethyl	SW-846 8270A	U	15
Pentachlorobenzene	SW-846 8270A	U	1.4
Pentachloronitrobenzene	SW-846 8270A	U	2.3
Pentachlorophenol	SW-846 8270A	U	4.88
Phenacetin	SW-846 8270A	U	1.6
Phenanthrene	SW-846 8270A	U	6
Phenol	SW-846 8270A	**22.7**	2.83
1,4-Phenylenediamine	SW-846 8270A	U	20
2-Picoline	SW-846 8270A	U	1.3
Pronamide	SW-846 8270A	U	2.4
Pyrene	SW-846 8270A	U	7.43
Pyridine	SW-846 8270A	U	3.49
Safrole	SW-846 8270A	U	2
1,2,4,5-Tetrachlorobenzene	SW-846 8270A	U	1.6
2,3,4,5 or 2,3,4,6-Tetrachloropheno	SW-846 8270A	U	32
Tetraethyldithiopyrophosphate	SW-846 8270A	U	1.9
o-Toluidine	SW-846 8270A	U	1.1
1,2,4-Trichlorobenzene	SW-846 8270A	U	4.86
2,4,5-Trichlorophenol	SW-846 8270A	U	4.27
2,4,6-Trichlorophenol	SW-846 8270A	U	4.63
o,o,o-Triethylphosphorothioate	SW-846 8270A	U	1.7
1,3,5-Trinitrobenzene	SW-846 8270A	U	8.9
3 and 4- Methylphenol (m+p cresol)	SW-846 8270A	**11.6**	5.2

Notes:

Sample collected 01/30/98
Units are ug/L unless noted otherwise
Semivolitile extraction by SW-846 3510B
U = Not detected

Attachment 4
Summary of Pond 18 Decant WAP Sampling Results

Analyte	Analytical Method	Sample Date		
		07/07/99	07/12/00	06/15/01
Antimony	SW-846 6010B	0.50	0.331	0.32 J
Arsenic	SW-846 6010B	0.16	0.153	0.277
Barium	SW-846 6010B	0.025	0.0140 J	0.0590
Beryllium	SW-846 6010B	0.0082	0.00525	0.00382
Cadmium	SW-846 6010B	0.013	0.0516	0.0391
Chromium	SW-846 6010B	0.360	0.283	0.142
Lead	SW-846 6010B	0.04	0.0400 J	0.038 J
Mercury	SW-846 7040A	U	U	U
Nickel	SW-846 6010B	0.026	0.0589	0.050 J
Selenium	SW-846 6010B	0.03	0.0890 J	0.096 J
Silver	SW-846 6010B	U	0.00460 J	U
Thallium	SW-846 6010B	U	U	U
Vanadium	SW-846 6010B	NA	0.349	NA
Zinc	SW-846 6010B	NA	14.2	NA
Cyanide	SW-846 9010B/9012A	5.90	0.385	0.18 J
Cyanide, Amenable	SW-846 9010B/9012A	5.40	0.284	U
Phosphorus, total	EPA 365.3	NA	NA	0.510
pH	SW-846 9040B	6.92	6.69	6.510

Notes:

Units are mg/L unless noted otherwise
TCLP extraction for metals by SW-846 1311
U = Not detected
J = Estimated
NA = Not analyzed

Attachment 5
Summary of Pond 18 Decant Non-WAP Sampling Results

Analytes	Analytical Method	Total	Dissolved
Aluminum	EPA 200.7	0.9	NA
Antimony	EPA 200.7	0.29	0.27
Arsenic	EPA 200.7	0.21	0.2
Barium	EPA 200.7	U	U
Beryllium	EPA 200.7	0.003	0.003
Cadmium	EPA 200.7	0.063	0.047
Calcium	EPA 200.7	58.8	NA
Chromium	EPA 200.7	0.19	0.18
Cobalt	EPA 200.7	0.02	0.01
Copper	EPA 200.7	U	U
Iron	EPA 200.7	4.3	NA
Lead	EPA 200.7	U	U
Magnesium	EPA 200.7	14.94	NA
Mercury	EPA 245.1	U	U
Nickel	EPA 200.7	0.06	0.05
Potassium	EPA 200.7	3,550	NA
Selenium	EPA 200.7	0.08	U
Silica	EPA 200.7	0.1	NA
Silver	EPA 200.7	U	U
Sodium	EPA 200.7	1,087	NA
Thallium	EPA 200.7	U	U
Vanadium	EPA 200.7	0.13	0.12
Zinc	EPA 200.7	9.52	8.56
Cyanide	SW-846 9010B/9012A*	0.27	NA
Phosphorus - total	EPA 365.3	2,156	NA
pH	EPA 150.1	6	NA
Alkalinity, Total	EPA 310.1	987	NA
Alkalinity, Bicarbonate	EPA 310.1	987	NA
Alkalinity, Carbonate	EPA 310.1	U	NA
Ammonia	EPA 350.1	73	NA
Chloride	EPA 300.0	505	NA
Fluoride	EPA 300.0	472	NA
Nitrate, N	EPA 300.0	2	NA
Sulfide: SO2	EPA 200.7	138	NA
Total Sulfur: SO4	EPA 200.7	1,305	NA
Ortho Phosphorus: P	EPA 365.2	1,891	NA
Conductivity us/cm	EPA 365.2	13,150	NA
Turbidity, NTU	EPA 180.1	7	NA
Total Dissolved Solids	EPA 160.1	14,956	NA
Total Suspended Solids	EPA 160.2	95	NA

Notes:

Units are mg/L unless noted otherwise

The sample for the above results was collected on 09/29/01 and analyzed in Astaris's on-site laboratory.

* = Astaris proprietary method equivalent to SW-846 9010B/9012A was used.

U = Not detected

NA = Not analyzed